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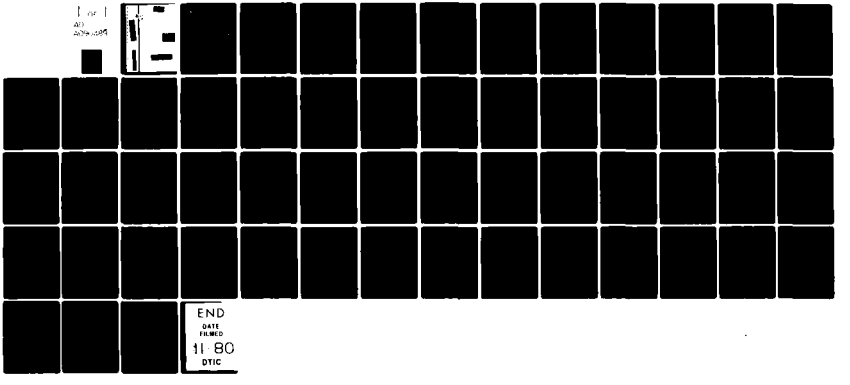

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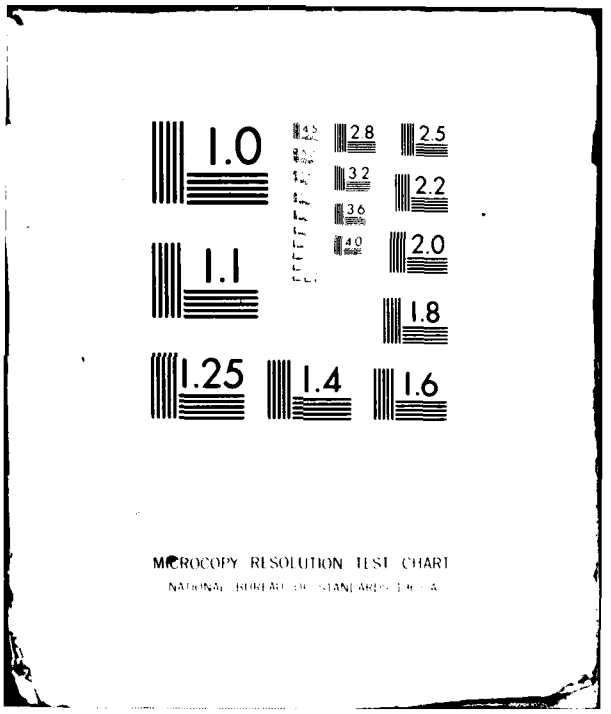
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PROBLEMS OF SEA CONTROL IN THEATER NUCLEAR WAR

FINAL REPORT
SPC 826

April 1980

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FINAL REPORT
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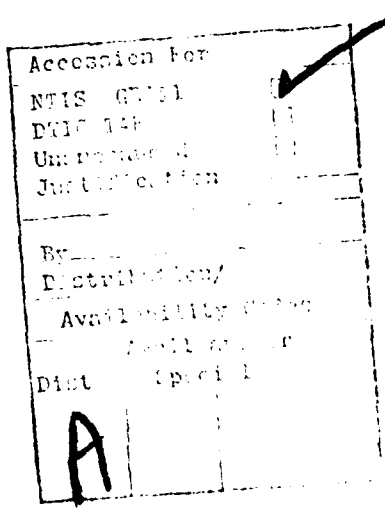
CONTENTS



I. EXECUTIVE SUMMARY

> The history of warfare from antiquity to the present records innumerable attempts to secure by some new contrivance an immediate tactical advantage, perhaps a decisive one. In such inventions the essential purpose is to obtain one's end before the adversary can bring counter-measures to bear. It is the time interval that counts.
>
> Bernard Brodie, Sea Power in the Machine Age

A. PURPOSE

The purpose of this study is to investigate the problem of sea control in theater nuclear war. In doing so, particular attention has been given to (a) the importance of sea control in U.S. global strategy, (b) the vulnerability of the U.S. Navy to nuclear attack, and (c) some ways in which the Navy might reduce its prevailing vulnerability to nuclear attack in the future. This study has been prepared at the request of the Assistant to the Secretary of Defense (Atomic Energy).

B. BACKGROUND

For the maritime nation, the principal object of naval warfare is to establish and maintain control of the sea. By definition, the security and vitality of the maritime state depends on its assured ocean access. While such access is generally a matter of course in times of peace, in times of war it becomes a problem of critical importance. At such times the use of the sea must be guaranteed by force of arms. Having established sea control, all else is possible; distant interests can be defended and domestic

prosperity secured. Should the maritime power lose its contest for command, however, its sacrifice will be great. Failure to control the sea in war will necessarily mean military defeat abroad and economic and political dislocation at home.

By all relevant criteria the United States is a maritime power. In peace, the economic and political integrity of the United States is predicated on the availability of foreign markets and resources. In war, the viability of our war effort and that of our allies will depend on access to strategic materials located aboard, as well as the capability to project forces overseas. On the evidence of history, the ability to command the sea in the face of adversity is the essential prerequisite to meeting our national requirements and commitments. While it is both impossible and unnecessary to establish exclusive domain over all the world's oceans, it is important to be capable of controlling selective maritime areas in support of specific interests and objectives. In recognition of this fact, sea control has long been the principal wartime mission of the U.S. Navy.

Guaranteeing command of the sea has generally not posed a problem in the postwar period. From the Second World War until today, the U.S. Navy has not faced an important maritime threat. Although our major adversary over this period, it is only in recent years that the Soviet Navy has emerged as a force to be reckoned with in a future war. Of particular concern are Soviet preparations for naval nuclear war. Nuclear weapons have become an important component of Soviet maritime capabilities. While we remain unclear as to the conditions under which nuclear weapons would be released, the precise purposes for which they would be employed, and the constraints which would be observed in their use, the available Soviet literature on the subject leaves no doubt in the mind of the reader that Soviet naval planners are, in the abstract, willing to go nuclear at sea. This view is supported by evidence on the weapon loadouts aboard Soviet combatants, as well as information gathered in the observation of Soviet naval exercises. Together they illustrate that the Soviet Union is capable of employing nuclear munitions in naval combat and that they are preparing for the day when they will do so.

The importance of Soviet preparations for maritime nuclear war cannot be overestimated. Nuclear weapons promise to radically alter the course of sea warfare. Many of the historically established principles of naval combat which presently guide matters of maritime strategy and force design will be of limited utility in any future naval campaign waged with atomic munitions. While the full implications and proper response to this development have yet to be fully understood, it is already clear that the U.S. Navy's prevailing order of battle and the operational concepts which direct its employment are inadequate for the task of dominating the seas in such a contingency. For reasons which will be discussed later, the U.S. Navy stands uniquely vulnerable to nuclear attack. While we can assume that the Soviets themselves do not fully comprehend the ramifications of employing nuclear weapons at sea, we must expect that they do appreciate the extent to which U.S. sea power is vulnerable to their use. This being the case, the probability that we will face a maritime nuclear conflict in any future U.S.-Soviet war is higher than it might otherwise be.

The problem of nuclear war at sea has been compounded by the limited attention it has received in the defense community. Although the Soviet Union has, for some time, possessed the ability to employ atomic munitions in the maritime theater, the issue is only now being considered. Even at this late date, consideration is tentative; those responsible for naval planning have yet to allocate sufficient resources to study this problem in the detail it deserves. While the Chief of Naval Operations (CNO) has recently initiated a series of studies to look into the issue of naval nuclear war, this effort is only a beginning. The commissioned analyses have, for the most part, focused on narrow issues of technology, with little consideration being given to the broader, and in the end, more decisive issues of strategy, battle tactics, and force structure--either those of the Soviet Union or the United States. Given the potentially revolutionary nature of naval nuclear war, these are serious deficiencies.

The need to begin responding to Soviet nuclear initiatives at sea is made urgent by the extended lead times associated with naval construction and the long expected service life of warships. In essence, naval planning

is long-range planning. A warship may require ten years to move through the planning process from authorization to design, construction, and finally deployment. Having deployed a ship, it will be with the fleet for twenty to thirty years. Should it undergo a service life extension program, this period could grow to forty years. Procurement decisions made today will, thus, directly impact on the warfighting qualities of the fleet many years hence. In this regard, as well, the problem of maritime nuclear war requires timely consideration. The longer we delay in confronting the issue of nuclear weapons in sea warfare, the longer we must make do with a naval force inadequate to the task of commanding the sea in a nuclear environment. Already the period of vulnerability will be a lengthy one. Assuming we knew what we wanted in the way of a nuclear capable navy it would be years before these plans could see the light of day.

The focus of this study is on U.S. surface forces. Short of central war, the surface navy continues to remain the most important component of the fleet, and it is, by far, the more vulnerable to nuclear effects. Given considerations of time, the major topics addressed in this study have not been discussed in the full detail they merit. In light of the paucity of literature on the subject of nuclear war at sea, it was thought best to provide an overview of the problem rather than focus on any of its particular aspects in exclusion.

C. KEY FINDINGS AND JUDGMENTS

In summary form, the conclusions of this study are straightforward. Over approximately the last decade, the Soviet Navy has expanded and refined its ability to wage maritime nuclear war. Far from being a haphazard venture, Soviet efforts to prepare for this eventuality have been methodically and soundly undertaken. Nuclear munitions have come to be an important component in the Soviet naval arsenal. As demonstrated in their military literature and peacetime naval maneuvers, nuclear weapons have been closely integrated with a general strategy of sea denial, and a set of battle tactics predicated on winning at sea with less.

Equally clear is the fact that U.S. defense planners have been remiss in preparing for the day when the Soviet Union might employ nuclear munitions in a future naval war. Although the problem of tactical nuclear weapons in ground warfare has long received attention, close consideration of their use at sea is notable only for its absence. In light of the potential consequences, the lack of interest in maritime nuclear war is difficult to explain. Although conclusions as to the level of damage the Soviets might inflict upon U.S. naval forces are importantly a function of the scenario and circumstances one chooses to adopt and are thus impossible to determine a priori, it is not hyperbole to state that the ability of the Navy to control the sea in a nuclear environment stands gravely in doubt. Considering the critical nature of sea control in U.S. strategic planning, this problem may warrant careful review.

While the situation is indeed in need of remedy, we find that the problem of sea control in a nuclear war is not an easy one to solve. Any attempt to redress the nuclear balance at sea immediately confronts our limited understanding of the nature of maritime nuclear warfare, and the absence of a framework of analysis on naval operations in a nuclear environment from which to draw. While naval warfare over the ages has experienced its "revolutions", the problem of combat at sea has remained similar enough that modern analogy could often be profitably drawn from historical experience. In short, the history of naval warfare provided planners of the day with a valuable reference point for considering prevailing problems of maritime engagement. There is much to suggest that nuclear weapons have changed this. Although historical experience will continue to prove a valuable tool in helping the naval analyst to understand conventional sea warfare, its value as a mechanism for understanding naval nuclear combat is circumscribed and must be employed with caution. The problem posed by nuclear weapons at sea is a novel one, and will require equally novel solutions.

Some of the key findings of this study follow:

- *The Soviet naval problem is intrinsically easier than that confronting the United States. The relative difficulty of respective U.S.-Soviet maritime objectives is magnified under conditions of nuclear war at sea.*

The principal wartime objective of Soviet naval strategy is to deny command of the sea to the West. In contrast, the primary mission of the U.S. Navy is to selectively establish deep sea control in support of a general strategy of force projection. Clearly, the mission of sea control is more exacting than sea denial. A navy designed to establish command of the sea demands a level of endurance and flexibility not required of a sea denial force. The reasons for this can be found in differing criteria for victory. For the nation seeking sea denial, victory is to be had by defeating the naval forces of its opponent or otherwise denying its access to critical points. In comparison, the sea control navy must defeat its adversary and survive. For reasons which are obvious, the problem of surviving a nuclear exchange is notably more difficult than enduring a conventional engagement. The relative difficulty of establishing command of the sea is, thus, further pronounced in a nuclear environment. In light of the more demanding requirements of sea control, in a naval race between a continental and maritime power there can be no question of parity.

- *The Soviet Union has developed a clear doctrine of nuclear warfighting, of which nuclear operations at sea is one dimension.*

The Soviet military has long considered nuclear weapons to be an important means of waging war. In line with this perspective, the Soviet armed forces have promulgated and refined a doctrine of nuclear employment encompassing both the land and maritime theaters. The contrast with the West is most pronounced on the issue of nuclear combat at sea. Although U.S. defense planners recognize the possibility that a land conflict may well escalate beyond the nuclear threshold, U.S. planning for sea warfare is based on the implicit premise that a future naval conflict will be conventional in scope. In distinction, over the last decade the Soviets have upgraded their ability to employ nuclear weapons in naval combat, either exclusive of, or in conjunction with conventional munitions. The use of nuclear weapons at sea is widely considered in their professional literature and is manifest in their naval exercises.

- *Soviet tactics for naval engagement have been closely tailored to the vulnerabilities of the U.S. surface fleet.*

In the event of a future war at sea, the Soviet Navy will seek to defeat the West by means of superior tactics. Soviet doctrine for naval engagement supports this view. In attacking surface forces, the Soviet Navy will attempt to strike high value units en masse and with surprise. Conditions permitting they will employ a combination of arms against important targets in an effort to complicate their defensive problem and ensure saturation. The use of nuclear weapons at sea is a component of these tactics. The preemptive employment of nuclear munitions against an unprepared opponent promises to deliver decisive results. As with Soviet naval doctrine in general, their employment is designed to allow an otherwise inferior force to win with less.

- *While perhaps still capable of successfully conducting conventional operations at sea, the surface navy stands critically vulnerable to nuclear attack.*

The surface navy has effectively concentrated its strike assets in twelve warships, the attack carriers. The balance of the Navy's surface combatants are charged with the mission of carrier defense. Although mission specialization has proferred certain rewards, the net result is that the surface fleet has become disproportionately vulnerable to the destruction of a very small number of warships. Naval planners have predicated this force design on the assumption that the attack carrier will be capable of sustaining some small number of hits without breaking off operations for any extended period. While this might be expected in a conventional engagement, for obvious reasons this will not be the case in a nuclear conflict. At such time the Navy must expect to lose its forward deployed carriers in short order. Considering the prevailing division of labor of the surface navy, the loss of the carriers will effectively mean the neutralization of the balance of the surface fleet.

- *In investigating the alternative ways in which U.S. naval vulnerability to nuclear attack can be reduced, it will prove valuable to move to counteract the problem posed by the concentration of surface strike capabilities.*

Navies are characterized by a relatively low number of high value platforms. As noted, the U.S. surface fleet has further reduced its effective size by concentrating its strike capabilities aboard the attack carrier. In presenting the enemy with a relatively small target set, navies in general and the U.S. surface fleet in particular suffer from the natural vulnerability associated with low numbers. Each combatant represents a relatively sizable percentage of aggregate fleet capabilities, and losses are suffered accordingly. Given the high expected rate of ship loss, the problem of low numbers promises to be particularly severe in a nuclear conflict at sea. If fleet effectiveness in a nuclear environment is to be upgraded, the problem of low numbers must be reduced. Some of the ways in which this might be accomplished are discussed in the body of this study. These include: the dispersal of surface strike assets across a larger number of platforms, the greater use of "expendable" combatants, the greater and more diverse employment of long-range, land-based air as a partial substitute for conventional naval assets, and the greater exploitation of Soviet naval vulnerabilities to achieve economies of effort in a future naval war. These and other possibilities which have not been discussed in the body of this study merit further investigation.

II. SOVIET OBJECTIVES AT SEA

Given the historically continental perspective of the Soviet state it should not be surprising that the larger objective of Soviet naval operations has traditionally been sea denial. As a power whose principal interests have historically centered on those territories lying contiguous to its borders, the military problems facing the U.S.S.R. have, in the past, called predominantly for the application of ground as opposed to naval forces. In this regard, it has been a long standing tenet of Soviet naval strategy that the wartime employment of naval forces should remain subordinate to considerations of land warfare. In contrast to Anglo-American naval doctrine, which in the tradition of Corbett and Mahan has stipulated that fleets be employed in an extended and aggressive manner for the purpose of contesting for command of the seas, Soviet naval war plans have typically envisioned close deployments for purposes of direct continental defense and support.

Within this context it is important to note that the manner in which Soviet naval planners have envisioned supporting land operations has changed significantly over the last three decades. Constrained by tight budgets and bound by tradition, the missions of the early postwar Soviet Navy were for the most part confined to securing the seaward flanks and rear areas of the Red Army. In recent years, however, we have witnessed the notable expansion of Soviet maritime interests and capabilities. Over approximately the last two decades the Soviet Navy has grown from an essentially coastal defense force to one which is increasingly capable of challenging U.S. naval supremacy on the high seas. Over this period the orientation of Soviet maritime strategy has remained defensive in character. Excepting considerations of central war, Soviet military planning continues to center on the demands of a European c nflict. Thus, unlike the United States which must command the North Atlantic and surrounding seas if it is to retain access to the

continent, the Soviet Union has no requirement for deep sea control. If in times of war the Soviet Navy is successful in denying control of the European littoral to allied forces, it will have realized its mission and instrumentally furthered Soviet efforts on the ground.

Soviet maritime defense requirements and activities are broadly defined around three defense zones, extending concentrically from the Soviet coast out to sea.[2] Not surprisingly, Soviet interest in the security of these areas is importantly dependent upon their proximity to Soviet shores. The inner or "pre-coastal" zone requires the closest attention and a high percentage of Soviet maritime assets are devoted to its defense. In turn the secondary defense area, termed the "remote off shore" zone, receives the larger balance of Soviet concern. Beyond this perimeter lies the open sea, which Soviet naval planners consider to be the third security zone. The important feature distinguishing between each zone is the degree of force the Soviet Union is capable and willing to bring to bear in its defense. In this regard, the general boundary between one zone and another is not exclusively a question of its distance from the Soviet coast line at any particular point, but is also influenced by considerations of topography, the location of political frontiers, and the importance of the maritime area in Soviet war plans.

In the European theater, the inner defense perimeter roughly constitutes the Baltic, Barents, and Black Seas. In time of war, the Soviet Navy will seek to control these areas by means of combined air, ground, and naval operations. While deep sea control is not a Soviet objective, doctrine does require that control be established over the pre-coastal zone. In the Soviet view, the prerequisite for strategic sea denial is the creation and maintenance of "favorable operating conditions" for the fleet. This requirement, in turn, establishes the need for control over those waters deemed essential for the subsequent forward deployment of Soviet forces. Additionally, control over the inner defense zone is designed to provide a sanctuary for the ballistic missile submarine (SSBN) force, a high percentage of which will be operating in these waters in times of war. Despite repeated reference to the difficulties inherent in locating, identifying and tracking a nuclear submarine, Soviet commentators regard Western ASW capabilities as formidable.

In this regard it is deemed essential to provide the SSBN fleet with a secure haven for wartime operations. As Western ASW capabilities have grown in sophistication, this mission has been accorded increasing importance.

In a continental war, command of these areas would also promise major dividends for the West. Control of the inner defense zone would not only positively impact on the war at sea, but would notably contribute to the land battle, through directly threatening Soviet territory and severing the seaward flanks of Soviet forces on the ground. While tempting objectives in the abstract, the practicality of contesting for control of these areas is doubtful. The assets which the Soviet Union can bring to bear in the defense of the pre-coastal zone are considerable. In this they are assisted by geography. While geography is certainly a constraint on Soviet maritime activity in general, it serves to support Soviet efforts to defend the European pre-coastal zone. In the event of East-West hostilities, we can expect Soviet maritime forces will attempt to seal critical choke points with mines, high speed coastal craft, land-based aircraft, and the deployment of shore-based anti-ship missiles. In this respect the U.S.S.R.'s "natural maritime limits," defined by those passages through which Soviet combatants must transit to and from the open sea, serve also as effective limits for allied naval operations in time of war.

Soviet planners anticipate that the critical fleet engagements of a European war will take place within the "remote off-shore" defense zone, which in the European theater roughly corresponds to the Norwegian, North and Mediterranean Seas. As the main axes of wartime advance for both the Soviet and Western navies, disrupting allied sea control efforts in these areas is considered to be essential if Soviet forces are to continue to conduct maritime operations in scale throughout the war. Failure to deny command of any of these seas to the West at the outset of hostilities will have the likely effect of sealing some percentage of Soviet naval assets in the Barents, Baltic, or Black Seas. In the event the West is successful in establishing control, a successful Soviet "breakout" at some later time is improbable.

In line with broader naval objectives, Soviet maritime forces will seek to disrupt allied attempts to command the seas surrounding Europe. In this respect Soviet planners have a clear appreciation for the limitations which still characterize both their navy and its supporting arms. While sea control is always the preferred outcome, Soviet forces generally lack the staying power required to establish and maintain undisputed command of an open sea. As will be discussed later in more detail, in many respects, the Soviet Navy remains a fragile force. Successful fleet operations critically depend upon close combined arms support and superior command and control. In the event wartime coordination is disrupted, Soviet vulnerability at sea increases dramatically. Similarly by virtue of its heavy dependence on combined arms support, the wartime disposition of Soviet surface combatants in particular is constrained by the effective operating radius of ground-based aviation. Given these operational constraints, denial rather than control remains the only feasible naval objective at this time in areas other then the Soviet littoral.

Soviet planners recognize, however, that if denial of the "remote off-shore" zone is essential to the integrity of Soviet continental strategy, control of these areas is equally critical for the West. Beyond the opportunity costs incurred, failure to establish command of the seas surrounding Europe would have untoward consequences for NATO ground operations, both directly, through presenting the possibility of Soviet landing operations and sea-to-shore bombardment against NATO's flanks, and indirectly, through opening the way for a Soviet campaign against the U.S.-European SLOC.

Until recently, Soviet naval planning was principally guided by the demands of securing control of "pre-coastal" areas and disrupting allied operations within the "remote off-shore" defense zone. While wartime deployments were certainly envisioned beyond these maritime areas, the degree to which Soviet forces could effectively operate in the open sea was closely circumscribed by limitations in fleet capability. As Soviet blue-water forces have grown, however, the outer defense zone has received much more attention. The growing Soviet interest in open ocean operations has manifest itself in the last fifteen years through longer and more extended deployments, high

visibility global exercises, and an apparently increasing interest in establishing foreign bases for fleet replenishment and repair. The reasons for this recent concern for the open sea are varied. Certainly the most important consideration, however, is the growing conviction on the part of Soviet military planners that the outcome of the open ocean war will critically impact on the course of any European conflict. Perhaps no where will this be more evident than in the war for the SLOC.

While often underrated in the West, a principal mission of Soviet maritime forces is SLOC interdiction.[3] For reasons which are obvious, the importance of a campaign to disrupt seaborne reinforcement will grow dramatically as a European land war becomes protracted. Soviet planners correctly note that in an extended European campaign the ultimate success of Soviet efforts on the ground may hinge instrumentally on issues of supply. After the first weeks of sustained engagement, NATO stocks of a variety of essential materials will have been dangerously depleted. This period could easily grow shorter depending upon Soviet success in eliminating prepositioned supplies at the outbreak of hostilities. Despite the recent expansion in U.S. airlift capacity, the prevailing capability to reinforce NATO from the air falls far short of the likely requirements. Indeed, it must be assumed that shortly into any European war, those airfields capable of servicing the largest of U.S. transport aircraft will have been destroyed, thereby reducing the effective capacity of air resupply still further. For these reasons, secure resupply by sea is a prerequisite to NATO's ultimate success. While the ground campaign will be the decisive factor determining final victory or defeat, the war for the SLOC will in large measure determine NATO chances on the ground.

III. THE CONDUCT OF SOVIET NAVAL OPERATIONS

In speculating on the manner in which Soviet naval forces might be employed in war, it is well to remember that, historically, the Soviet Navy has not enjoyed the same independence in decision making as its Western counterparts. The navy, as the other Soviet services, falls under the direct jurisdiction of the General Staff which today, as in the past, has been decidedly dominated by the ground forces. Although there has usually been a naval representative at the high command level, the scope of his influence has traditionally been minimal. In recent years the Soviet Navy has succeeded in gaining a greater degree of autonomy in charting both its day-to-day affairs as well as its longer range plans. Despite this fact, however, the influence of the ground forces through the mechanism of the General Staff remains pervasive.

The influence of the ground forces has had two important effects on Soviet naval strategy and force planning. First, it has contributed to the above noted tendency to view the navy as simply the maritime arm of the Red Army. This has, in the past, not only impacted on Soviet naval objectives, it has also importantly influenced force design and procurement decisions. Secondly, and more importantly for this discussion, the ground forces have heavily influenced the development of Soviet naval doctrine and operational concepts. In distinction to Western military tradition, Soviet naval strategy has come to be guided by a broader military-theoretical framework which sets forth a series of principles of action common to both the maritime and ground theaters of operation. In this respect, there is something which can meaningfully be termed "the Soviet style of warfare," which, at the higher levels of strategy and operational art, is as applicable in considering possible Soviet behavior at sea as it is in understanding Soviet actions on the ground.

Three principles or areas of concern in general Soviet military doctrine are of particular importance for our discussion here: force concentration, surprise in attack, and the potential advantages imparted by nuclear weapons. As we will see, Soviet views on each of these issues are very much interrelated. Perhaps no where is this more evident than in their application to naval warfare.

A. CONCENTRATION OF FORCE

Concentration of effort is a cardinal tenet of Soviet military doctrine. While doctrine notes that Soviet combat groupings will not always find themselves numerically superior to the enemy in the aggregate, opportunities will be presented, or can be created, for establishing local superiority through concentration at the operational or tactical levels. As revealed in the following passage in Voyennaya Mysl', battlefield superiority through concentration is considered to be an essential element in determining victory or defeat.

> Superiority accelerates the process of the physical and moral defeat of the enemy, makes it possible to operate more daringly and decisively, and to impose one's will on the enemy and to attack him more successfully. It promotes the development of flexibility in the selection of scales, forces and methods of conducting combat operations, expands the scope and methods for coordinating the delivery of nuclear fire and air attacks with the course of military operations. Conversely, an obvious shortage of forces substantially limits capabilities for organizing the repulsion of the enemy.[4]

While the principle of force concentration was originally applied to problems of ground combat, with the growth in the Soviet blue water fleet it has come to influence Soviet naval doctrine and force structure. At the present time, the favored Soviet tactic for fleet engagement is to concentrate firepower against the high value units of the enemy (preferably carriers) from geographically dispersed positions. The object of this tactic is twofold: (a) to saturate the enemy's seaborne defense to ensure a hit, while minimizing general vulnerability by means of dispersal and (b) to maximize the effectiveness of an attack through destroying those targets deemed critical to future enemy operations.[5]

> To attain victory over the enemy one must not dissipate his forces and means equally across the entire front, but the main efforts must be concentrated on the most important axis or sector and at the right time in order to form there the necessary superiority over the enemy in men and weapons.[6]

In massing for the attack, plans ideally call for the integrated employment of subsurface, surface and air assets. Although exacerbating problems of coordination, the employment of such a mixed force allows the Soviets to bring to bear greater firepower than would otherwise be available, while simultaneously compounding the defensive problem for the U.S. surface fleet. In the event that massed force is successfully directed against critical enemy sectors or targets in a timely fashion, victory can be had with an economy of effort. Such economies in force expenditure in turn have important ramifications for the size of the force required to successfully engage an opponent. Assuming one's assets can be so husbanded, concentration against "critical nodes" allows one to win from a position of relative overall inferiority. What is important is rather local superiority properly applied. This is of particular value for the Soviet Navy, which as a relatively inferior force, is charged with the wartime mission of selectively neutralizing Western control of the seas.[7]

The above tactic for fleet engagement was developed in response to the early disparity between Soviet capabilities and objectives at sea. Although sea denial is certainly a less demanding maritime goal than sea control, in the early postwar period Soviet naval assets were, nevertheless, clearly wanting to the task. Soviet planners were quick to understand that the fast attack carrier was the principal source of the U.S. advantage at sea. In terms of its combat range, flexibility, durability and firepower it was far and beyond a superior instrument of seapower to anything the Soviet Navy could hope to deploy in the near distant future. In an effort to establish a relatively quick and cheap counter to the carrier, the Soviets in the early 1960s opted to build a large number of small, lightly protected, and generally expendable surface combatants to be used in conjunction with other maritime assets as anti-carrier platforms. Centrally coordinated from shore and armed with long range missiles, the Soviet Navy sought to defeat the carrier

by means of superior numbers as against superior unit quality. Timing and coordination in firing is correctly considered essential for the success of this tactic. Given the limited and in some cases nonexistent reload capability of many Soviet vessels, it is imperative that the first salvo meet with success. In order to maximize the chance of success, a high density attack is required.

Current Soviet doctrine for fleet engagement is a classic application of the principle of force concentration. Firepower is not only massed for the purpose of establishing local superiority, but fire is focussed on the critical target, in this case the attack carrier. Given the centrality of of the carrier for U.S. naval operations, their destruction could very well allow Soviet maritime forces to win from an otherwise inferior position at sea.

B. SURPRISE

As with the principle of "force concentration" the principle of "surprise" has an important place in Soviet military doctrine and training. As the victims of Barbarossa in 1941, certainly one of the most successful surprise attacks in history, the advantages of striking with surprise, as well as the dangers of being surprised, have come to be clearly evident in Soviet military circles.

While it is has been opined that the Soviets have much to learn about the subtleties of strategem, Soviet understanding of the value of surprise in war is clearly manifest throughout their military literature. The achievement of surprise in the timing, location, and/or the manner of attack is heralded as a potentially deciding factor in modern warfare, one for which the Soviet armed forces should constantly strive. Representative of the attention surprise receives in Soviet military literature are the following passages:

> Surprise is one of the most important principles of military art and consists of the choice (selection) of times, techniques, and methods of combat operations, which permit delivery of a strike when the enemy is least prepared to repulse it and thereby paralyzing his will for organized resistance. . . . The enemy, not

> prepared to ward off the surprise attack, is compelled to change plans speedily and to adjust himself to operations of the side which has captured the initiative.[8]
>
> The goal of surprise actions consists of dumbfounding the enemy and catching him unawares when he is least prepared to parry an unexpected attack, paralyzing his will to resist, depriving him of the opportunity of taking quick effective countermeasures, and thus resolutely routing even his superior forces with least losses to friendly troops.[9]

Soviet appreciation of the military value of gaining surprise over the enemy as well as their determination to never again be caught unaware, are made all the more imperative by the widespread introduction of nuclear munitions and precision guidance technologies. Now, more so than ever before, the advantage in war will go to the protagonist who manages the unexpected in a manner superior to his opponent.

> Surprise has been a most important principle of military art since older times. The employment of nuclear weapons has considerably increased the role and importance of surprise.[10]
>
> With the employment of nuclear weapons, the decisiveness and scope of the offensive are increased, the times for the attainment of its goals are reduced, and the significance of surprise and the time factor increases even more.[11]

The importance of surprise in naval combat has long been apparent to Soviet military planners. As with surprise in non-naval operations, the value of effecting surprise over an opponent at sea, as well as the dangers of being surprised, have increased dramatically with the introduction of nuclear weapons to the maritime theater. Indeed, the first Soviet discussions of surprise in ocean warfare, during the early and middle 1960s, were in reference to nuclear war at sea. From the perspective of Soviet naval commentators of the time, in view of the relatively low number of combatants available to both sides, as well as the high vulnerability of naval units to nuclear effects, the issue of surprise in naval warfare had taken on a new importance. The protagonist who is first to employ nuclear weapons in a naval engagement against an unexpecting opponent could well determine the subsequent course of the war at sea. According to Admiral N. D. Sergeev, then Chief of Staff of the Soviet Navy:

> In contemporary conditions the factor of surprise grows increasingly. If in the last World War surprise brought relatively short-term advantages to the attacker, currently surprise attacks with missile-nuclear weapons are filled with catastrophic consequences.[12]

In recent years these sentiments have been echoed by Gorshkov himself, who has clearly stated that a nuclear war at sea will be most successfully conducted, not by means of classical fleet action, where the naval contest is decided "through a duel", but, where conditions permit, by means of "unilateral single operations against the enemy." In an effort to maximize the probability of success, strikes against an opponent must take place within "a strictly limited and very brief time-frame, before (the enemy force) is able to employ its weaponry in full measure." In this respect, the war at sea is effectively reduced to a "struggle for the first salvo."

> Now, when in a few minutes it is possible to reach large strategic targets, and in certain instances to attain individual aims of the war, the need arises because of circumstances to maintain the highest readiness of personnel and arms of the navy. . . .
>
> In light of the above said, the long familiar formula "struggle for the first salvo," acquires in naval conflict in contemporary conditions [conditions in which it is possible to apply military means of colossal power] special significance. Delay in using weapons in naval conflict. . . will inevitably cause the gravest and even catastrophic consequences regardless of where the fleet is located, at sea or in (its) bases.[13]

To an important degree surprise in attack will minimize the degree to which forces must be concentrated in order to successfully strike enemy naval groups. This will be particularly true in the event nuclear weapons are employed. What is important for the success of any combat action, naval or otherwise, is not the amount of force one can bring to bear on a target, per se, but the degree of damage the designated target ultimately sustains. In order to inflict an equivalent degree of damage, it stands to reason that one will be required to amass a larger force against an alerted and prepared opponent than against one which has been taken by surprise. In this vein, Admiral N. M. Kharlamov writing in Morskoi Sbornik stated that:

> . . . it is entirely unnecessary to redeploy large forces from one area to another, to concentrate them in the region of military actions creating powerful groups with cumbersome and difficult-to-manage military arrangements. Any substantial group of vessels at sea can now be destroyed in a very short period by a comparatively small group of carriers of far reaching missile-nuclear weapons which has been deployed in advance in certain areas.[14]

The manner in which surprise might be achieved at sea has been an important consideration in Soviet naval literature. While acknowledging that modern surveillance and communications systems make surprise through secrecy more difficult in the future, Soviet naval commentators are quick to note that advances in weapons speed, range, and guidance make opportunities for surprise through rapid action significantly greater than had been previously thought possible. If the military-technical revolution has increased the opportunities for effecting surprise in the above respect, in the view of Soviet planners, it has further created the possibility of achieving surprise in the manner in which the attack is prosecuted, in the "forms of action" and "means of combat" employed against an opponent.[15] The issue of surprising an opponent with the means of attack becomes important in any consideration of transitioning from conventional to nuclear weapons. Against an otherwise prepared adversary, a preemptive nuclear strike may deliver a disproportionately favorable result. As will be discussed later, the assumption on the part of U.S. planners that a naval engagement between U.S. and Soviet forces will be confined to the exchange of conventional munitions makes surprise in the manner of attack an ever present and dangerous possibility.

C. NUCLEAR VS. CONVENTIONAL WEAPONS

A striking feature of Soviet military doctrine is the emphasis it places on the problems and prospects of waging nuclear war. From an early period Soviet military planners have considered nuclear munitions to be a fundamental component of a larger warfighting capability. Unlike prevailing Western views on this subject, the Soviets perceive nuclear weapons to be an important, and if properly employed, potentially decisive means of tactical combat; one which should not, a priori, be forsaken by the Soviet armed forces during

even the initial period of war. In line with this perspective, the Soviets have promulgated and refined a clear doctrine of nuclear warfighting, which seeks to harness atomic power to Soviet offensive operations.

While recognizing that hostilities with the West might begin with a conventional phase, escalation to nuclear war is anticipated. In the Soviet view, a conventional conflict could transition to nuclear war at a moments notice, and Soviet forces must not be caught unaware and unprepared. In contrast to NATO employment concepts, Soviet doctrine recognizes no value in selectively utilizing nuclear weapons as a means of signaling resolve or as a way of limiting the ultimate scope of their use. To do so would serve only to alert one's opponent and eliminate the advantage inherent in striking with surprise. In the event nuclear weapons are to be used, doctrine calls for their extensive and intensive employment, with the object of maximizing their initial effectiveness and perhaps precluding a response in kind. In line with this objective, the Soviets emphasize the need to "anticipate" any NATO use of nuclear weapons and strike preemptively in an effort to destroy the balance of Western nuclear forces on the ground.

> Preemption in launching a nuclear strike is considered to be the decisive condition for the attainment of superiority over (the enemy) and the seizure and retention of the initiative.
>
> A delay in the destruction of the means of nuclear attack will permit the enemy to launch nuclear strikes first and may lead to heavy losses and even to the defeat of the offensive. . . .[16]

Recent Soviet interest in upgrading their ability to conduct conventional operations should not be construed as downplaying their willingness to employ nuclear weapons should conditions necessitate their use. Rather than view conventional and nuclear weapons as potential warfighting alternatives, where nuclear munitions are considered as a hedge against the failure of the conventional campaign, the Soviets have traditionally considered them to be complementary. If properly integrated, the joint employment of conventional and nuclear weapons is clearly thought to be mutually supportive.

> The art of conducting military operations with the use of nuclear weapons and that of employing conventional forces have many fundamental differences. But they are not in opposition, are not mutually exclusive, and are not isolated one from the other. On the contrary, they are closely correlated and are developing as a single body. [17]

In line with a general doctrine of nuclear employment, Soviet naval planning anticipates the possibility that a war at sea might be waged with nuclear munitions. In stark contrast to U.S. naval doctrine and force structure, which are designed almost exclusively for conventional operations, considerations of nuclear war at sea have had a persistent and notable impact on Soviet naval force planning and operating concepts.

As the following passage reveals, nuclear weapons, in certain circles, are considered to be the principal means of waging war at sea.

> The primary striking forces of the navy are the nuclear missile-carrying submarines and missile-carrying naval aviation which are designed to inflict nuclear strikes on the primary targets of the enemy in the main axes. In addition to this, nuclear submarines and naval missile-carrying aviation are the primary force and means to destroy ships armed with nuclear weapons on the sea. . . . Nuclear submarines are armed with long-range missiles and self-guided torpedoes with nuclear charges. . . From a long range, they have the capability to assure the destruction not only of naval targets but also of objectives located on the shore and in the enemy's rear. [18]

As with their use on land, Soviet nuclear employment concepts at sea call for widespread and where possible, preemptive attacks against high value naval targets. Once again, nuclear munitions are not considered to be a "last gasp" substitute for conventional operations, but will likely be used in conjunction with conventional weaponry.

> Missile nuclear weapons will become the decisive factor in warfare. Along with this, conventional arms will also be employed, while under certain conditions units and ships will be able to conduct combat operations only with conventional means. A war can begin with the employment of either nuclear or conventional weapons. Different variations in the use of all types of weapons are also possible. [19]

The need to simultaneously employ conventional and nuclear munitions will likely be made urgent by the mixed weapon loadouts and limited to non-existent reload capability of most Soviet combatants. While details of the conventional/nuclear weapons mix on Soviet warships are fragmentary, it is known that major combatants carry some combination of nuclear and non-nuclear munitions. At the present time, the warheads on these weapons are not interchangeable aboard ship. In this regard, should the Soviets choose to withhold ship-borne atomic munitions it will have the effect of partially disarming nuclear capable combatants. This problem is further complicated by the generally limited ability of Soviet units to reload surface-to-surface weapons. The net result is that without the employment of available nuclear munitions Soviet strike capabilities at sea will be seriously circumscribed.

While admitting to the superiority of nuclear weapons as a means of naval combat, the Soviet navy in the last fifteen years has sought to substantially enhance its conventional capabilities at sea. During this period Gorshkov and other naval leaders have continually stressed the need for a "balanced" navy, capable of successfully waging not only a nuclear war but "any possible war." In this vein, it has been stated that nuclear munitions "cannot completely replace surface vessels and aircraft (armed) with conventional weapons." Although this might be evidenced by some as a Soviet attempt to deemphasize the role of nuclear weapons in naval warfare, in the view of the author, these moves should be considered in the same light as Soviet efforts to upgrade their conventional capabilities on the ground. Rather than replacing atomic weapons as a means of waging a naval campaign, these efforts can better be seen as an attempt to redress the earlier capabilities imbalance resulting from the excessively high priority accorded nuclear operations in the late 1950s and early 1960s.

IV. ASPECTS OF U.S. VULNERABILITY AT SEA

There is a natural vulnerability associated with naval forces. In the past as today, navies have been characterized by a relatively low number of high value platforms. Regardless of the times, warships have been expensive to construct and maintain, thus serving to closely limit the number any nation could afford to deploy. As is obvious, low numbers ceteris paribus impart a degree of vulnerability to any force. A force characterized by low numbers concentrates a high percentage of aggregate capabilities in each participating unit. The loss of any one unit thus serves to reduce overall capabilities to a greater degree than if these were dispersed amoung a larger number of combatants.

Until recently, the vulnerability imparted by low numbers has not been a serious problem at sea. In general, any danger posed by low numbers was offset by the nontrivial problems of locating, tracking, and ultimately killing a warship. If it chose to sail undetected, a surface force could be fairly assured of doing so if it were willing to take the appropriate evasive action. In the event it was in fact located and identified, one could not be confident of maintaining contact long enough to bring weapons to bear. Even assuming a hostile force could be tracked, limitations in warship speed and the means of combat made it a matter of some doubt as to whether one could close with the enemy in battle if he sought to avoid it. Finally, if successful in making contact with the enemy, a commander's ability to sink or even severely damage his adversary's force was severely constrained by limitations in armament. The history of sea warfare is replete with examples of each of these problems. While there are certainly some noteworthy exceptions, as a result of these difficulties, major naval engagements of the past have tended to be infrequent and less than tactically decisive in their outcome.

Today's naval environment at sea, however, is quite different than that facing naval forces even twenty years ago. Most importantly, those factors which once effectively offset the problem of low numbers are, for the most part, no longer operative. Naval technology has progressed to the point where locating, tracking, and finally destroying a surface vessel is a matter of comparative ease for the superpower willing to employ its most advanced and damaging hardware. In particular, ongoing advances in ocean surveillance, precision guidance, weapons range, and warhead design, suggest that naval warfare in the future will be notably more lethal than that which we have observed in the past. While shipborne defenses have unquestionably improved over this period, they have generally not kept pace with the offensive threat.

Rather than work to offset the vulnerability of low numbers, U.S. naval force structure and operating doctrine tend to exacerbate this problem by increasing the effective concentration of aggregate naval capabilities. As if the problem posed by the declining number of warships is not bad enough, real vulnerability is even greater than it would otherwise seem when one considers the fact that, at the present time, surface strike capabilities are effectively concentrated in twelve capital platforms, the attack carriers. While the locus of a navy's striking power has always been located in the capital ship of the day, the U.S. Navy has not had fewer capital ships on line since 1903. While the fast attack carrier is generally a difficult ship to sink, it is not invulnerable. Moreover, it is unnecessary to destroy a carrier to neutralize its ability to engage the enemy. All that is required is to effect sufficient damage to disrupt flight operations, whereupon its immediate combat utility is at an end.

The standard tactical formation of the U.S. surface navy is the carrier battle group (CBG), composed of an attack carrier and supporting escorts. As currently configured, the CBG operates in synergistic fashion; each combatant represents one component of a larger system designed to enhance the battle groups overall offensive and defensive potential. While also responsible for its own defense, the primary role of the carrier (today, as in the past) is anti-fleet action and the projection of force ashore. In turn, the

principal mission of the attendant escort is carrier defense. While defensive support has always been an important mission of capital ship escorts, this role has historically been combined with an independent ability to engage in classical fleet action as well as to support close ranged operations ashore. Capital ship escorts have regularly proven their offensive value in fleet and shore engagements, both independent of, and in conjunction with, carrier aviation. Since the end of the Second World War, however, the ability of standard surface ships to conduct independent strike operations has been notably reduced. Over this period surface strike capabilities have increasingly devolved to the fast attack carrier, while the carrier escort has come to specialize in ASW and AAW operations in an effort to upgrade carrier defense.

Although specialization of function has certainly enhanced the defensive capability of the CBG, the U.S. Navy has concentrated its surface offensive capabilities in the carrier with seemingly little consideration for the consequences of their destruction. The situation today is such that, if faced with the loss of its carrier(s), the surviving battle group would be virtuvirtually incapable of conducting aggressive and sustained offensive operations against most enemy naval or shore targets. Even the ASW capabilities of the remaining escort would be notably circumscribed by virtue of its important reliance on carrier-based air. In this respect, while we can agree that the CBG is an impressive looking force prior to the opening of hostilities, its combat effectiveness, as currently configured, is open to question. Certainly, however, the Navy is remiss in concentrating its surface strike capabilities aboard such a small number of platforms. In so concentrating its strike power, the Navy has become inordinately vulnerable to the loss of only twelve warships. Should some small number of carriers be put out of action, aggregate surface capabilities would be measurably diminished. As noted above, Soviet naval forces and engagement tactics are designed to do just this.

The problem posed by the concentration of naval power becomes acute when we consider the possibility of nuclear war at sea. Despite ongoing attempts to upgrade battle group defenses, the Navy admits that under

virtually the best of circumstances the CBG will be incapable of projecting a preclusive defense against a determined and coordinated Soviet assault. In this regard, the combat effectiveness of the carrier battle group is ultimately predicated on its ability to absorb some number of hits without breaking off operations for any extended period of time. This is particularly true of the carrier itself, which is ideally capable of sustaining multiple HE detonations without going to the bottom.

While the ability to so withstand a Soviet attack might be possible in a conventional war at sea, this will certainly not be the case if Soviet maritime forces choose to employ nuclear munitions. In this circumstance, to hit is to kill. Indeed, given the limited degree to which U.S. warships are hardened against nuclear effects, a near miss with a nuclear warhead will be quite sufficient to destroy its intended target. Moreover, in view of the battle group's relatively tight combat formation, in the event of a nuclear engagement at sea, we can expect to see multiple warships damaged and/or killed from a single detonation.

Aside from the problem of outright destruction, nuclear bursts in even the extended vicinity of the battle group promise to significantly disrupt shipboard electronics, which in turn will adversely affect weapons and communications capabilities. Atmospheric bursts in the general area of a warship, even if they do not destroy or damage its superstructure, are likely to eliminate much of its topside antenna, radar, etc., which are capable of withstanding very low psi. Perhaps the most important source of this problem, however, lies with the large electromagnetic pulse (EMP) given off from an atomic detonation. Solid state components, which compose the balance of U.S. shipboard electronics are highly vulnerable to this effect. While the problem will be less severe at low altitudes, at very high altitudes a nuclear burst is capable of degrading electronic-dependent defense and communications systems at extreme ranges.

In this respect, it would be unnecessary for the Soviets to directly target U.S. combatants with nuclear munitions to notably gain from their employment. A conventional attack on a battle group might be preceded by a series of exoatmospheric nuclear bursts designed to reduce its defensive

potential. Having degraded its combat effectiveness, a conventional attack would be launched with the aim of exploiting its immediate vulnerability. The value of such a tactic would be that it tends to blur the division between nuclear and conventional war, thus very possibly precluding a nuclear response. As a minimum, this tactic could prove to be a more effective use of maritime nuclear munitions.

While estimates as to the precise nature of the nuclear threat at sea will vary, in all instances it must be considered severe. As illustrated in the preceding chapter, the Soviets show every indication of being willing to go nuclear at sea in the event of a major confrontation with the U.S. Navy. Indeed, as we have argued here, in light of their general naval inferiority, Soviet maritime forces may very well have little alternative but to employ nuclear munitions if they seek to win the naval engagement. Given their nuclear superiority at sea, the employment of atomic weapons promises the Soviets a naval advantage they would not otherwise possess.

As briefly illustrated in the last few pages, not only are Soviet maritime forces capable of employing nuclear weapons against U.S. fleet groups, but the U.S. Navy stands uniquely vulnerable to their use. As currently configured, forward deployed carrier groups stand critically vulnerable to being swiftly put out of action in the event of a nuclear confrontation with Soviet maritime forces. Under conditions of nuclear war at sea, the CBG cannot be expected to survive its permeable defense. Any leakage in CBG defenses during a nuclear engagement is likely to end with the destruction of the target carrier, and the subsequent neutralization of the surviving escort. While it is true that escorting vessels will tend to act as a soak for missiles directed against the carrier, this is of little solace. Having destroyed some percentage of the escort, the vulnerabilty of the attendant carrier will rise immeasurably.

A future war at sea will be distinct from our experience of the past. This will be particularly evident should nuclear weapons be employed in naval combat. In light of this fact, it is no surprise that the forces and tactics which once served us well are wanting to the task of controlling the sea today. In the event of a maritime nuclear conflict, the U.S. carrier

force will experience heavy losses. In light of the low number of carriers in the U.S. inventory and the central importance of the carrier battle group in U.S. surface warfare, the loss of even a small number of CVs could serve to cripple the navy's ability to realize its objectives in a high intensity naval war with the Soviet Union. Considering the importance of assured maritime access in U.S. strategic planning, this will, in turn, have untoward consequences for any general U.S. war effort.

V. ALTERNATIVES FOR COUNTERING U.S. NAVAL VULNERABILITY

The problems facing the United States Navy have become quite serious. As the preceding chapter suggests, in the event of a nuclear confrontation with the Soviet Union at sea, the U.S. Navy will be "going down to the bottom in ships". While the loss of even capital combatants is naturally to be anticipated in any major ocean war, the expected survivability of the current U.S. surface fleet is without modern precedent. It is highly doubtful that if faced with naval nuclear war the U.S. surface Navy will survive to establish, much less maintain, command of war-critical maritime areas. As noted above, in the absence of such control, U.S. interests abroad are simply indefensible short of general nuclear war. Encouraged by U.S. naval force structure, tactical practice, and a declining number of warships, Soviet maritime strategy, doctrine, and capabilities have been well conceived to deal a death blow to the U.S. surface fleet. Although largely composed of relatively inexpensive, lightweight platforms of minimal individual staying power, the Soviet Navy has, nevertheless, been designed with a close eye toward U.S. naval vulnerabilities. In predicating their forces and battle doctrine on points of U.S. naval weakness, the Soviet Navy is likely to prove quite capable of winning with less.

Clearly, major innovations in the structure of U.S. naval forces and the employment concepts under which these forces operate are in order. Unfortunately, however, at this writing the Navy is only slowly awakening to the problem at hand. While it has come to recognize the growing vulnerability of the carrier battle group to conventional attack, the evidence suggests that the Navy is continuing to downplay the magnitude of the nuclear threat at sea. If prevailing force structure and battle doctrine can be considered appropriate indicators of U.S. naval perceptions of the expected Soviet maritime threat, the Navy reveals no appreciation for the possibility

and impact of naval nuclear war. U.S. planning continues to be dominated by the assumption that a U.S.-Soviet naval conflict will be exclusively conventional in scope. Although the CNO has recently showed some interest in the implications of a naval nuclear conflict by initiating a series of projects on the subject, given the reluctance to confront this problem in the past, as well as the limited scope of the requested studies, one is left to wonder as to the degree of his concern.

Ironically, in the face of its vulnerability to nuclear attack, the myth prevails that the U.S. fleet remains a navy second to none and that in the event of a U.S.-Soviet naval confrontation, the U.S. Navy will sweep Soviet maritime forces from the sea. In this vein, Harold Brown writes that "Should deterrence fail, (U.S.) naval forces provide a full range of options for applying power rapidly and flexibly to control the scope and intensity of any conflict."[20] Such optimism is simply not supported by the facts. It is time to admit that with the outbreak of nuclear war at sea U.S. "control" will not be possible given the current configuration of U.S. naval forces. Far from being equipped to handle a "full range of options" the U.S. Navy's inability to operate in a nuclear environment will, under conditions of imminent nuclear engagement, provide them with two options, withdrawing from harm's way or steaming to disaster. By virtue of their vulnerability to nuclear strike, rather than limit "the scope and intensity" of a conflict at sea, U.S. naval forces will very possibly expand its ultimate dimensions by inviting nuclear attack. Vulnerability has little to recommend it as a deterrent.

If the U.S. Navy is to establish control of the sea in a future naval war with the Soviet Union, it must begin considering alternatives to its present force design. Most importantly in this regard, the Navy must find an alternative to its current high dependence on the attack carrier. Generally, future naval developments must move to counteract rather than complement the problem of low numbers. This can be accomplished in a variety of mutually supportive ways: by increasing the number of available combatants, spreading strike capabilities across a larger number of platforms, the refinement and greater use of cover and deception at sea, new operational

tactics, etc. In the final pages of this report we will briefly assess some of the ways in which the navy might begin to implement these measures. Given considerations of time, the following pages are designed to be suggestive rather than definitive. The viability of these and other potential measures to enhance the survivability and effectiveness of the U.S. surface navy deserves further investigation.

A. NUMBERS AND EXPENDABILITY

The introduction of nuclear weapons to the maritime theater promises to radically alter the course of naval warfare. Most notable amongst these changes will be the passing of the capital ship as we have known it. Naval nuclear weapons notably increase the vulnerability of individual combatants to battle damage or destruction. While surface units can be partially hardened against nuclear effects, even large combatants will remain critically vulnerable to close-range nuclear bursts. In this regard maritime powers can no longer afford to rely on a small number of capital combatants as their principal means of naval warfare. Naval planners considering the problem of nuclear engagement must prepare themselves for a significantly higher rate of warship loss then experienced in any previous sea war. The result is that, while unit quality will continue to play a major role in certain categories of naval combat (e.g., ASW, AAW, EW), numbers are likely to become an increasingly important factor in a future war at sea.

Fashioned in the carrier battles of World War II, today's naval order of battle and the tactical principles which direct its employment imperfectly reflect the changing parameters of naval warfare. As illustrated in the preceding chapter, the centerpiece of U.S. surface operations, the fast attack carrier, is likely to prove disappointingly ineffective in a nuclear engagement. Given the Navy's high dependence on the carrier, this in turn will importantly and negatively impact on the ability of the Navy to realize its mission objectives in times of war. As a partial remedy to this situation, the Navy must begin considering the ways in which it might disperse strike assets across a greater number of combatants.

For the surface fleet the necessary course of action is a clear one:

- The carrier escort must be capable of conducting independent strike operations against enemy fleet and ground positions through the provision of cruise missiles aboard all surface combatants of the battle group.
- The Navy must reinstitute the non-CV or Surface Action Group (SAG) as a viable offensive supplement to the CBG.
- Expand the construction of low end, "expendable" platforms.

As presently designed the attack carrier contains the only long-range strike capability of the CBG. If lost or heavily damaged in action the remaining battle group would be incapable of conducting all but the most minimal operations against an adversary. Through providing each escorting combatant with the means to independently engage the enemy, the depth and aggregate offensive potential of the carrier battle group would be notably upgraded. In the event the carrier was put out of action, the CBG would remain a viable instrument of sea control. As an additional measure, escorting combatants armed with cruise missiles would add a second dimension to the surface Navy's offensive arsenal, which is today virtually limited to free-fall ordnance delivered by manned aircraft. Beyond providing a measure of insurance against the loss of the attack carrier, such a capability would serve to compound the defensive problem facing the Soviet Union both at sea and on the ground.

Since the Second World War the non-CV surface action group has become a thing of the past. The reasons for its decline were both understandable and correct. As illustrated in numerous engagements during that war, a battle fleet without air support stood little chance of defeating an adversary employing carriers. The problem was one of relative combat radius. A surface group without support of aviation faced the prospect of defeat before it could come within firing range of its adversary. A foretaste of the future and the death knell of classic surface warfare came with the Battle of the Coral Sea in 1942. At no time during this action did the Japanese and American battle fleets make visual contact. This engagement, strategically one of the most decisive during the Pacific War, was waged exclusively with

carrier-based aircraft. While the non-CV surface group remained formidable in a close-in engagement, opportunities for close-range combat were to become increasingly infrequent as carriers came to dominate the war at sea.

Today, however, the growing vulnerability of the aircraft carrier and the advent of the cruise missile as a viable offensive instrument make the surface action group an increasingly attractive concept. Armed with sufficient cruise missiles, organic AAW and ASW defenses, as well as an aerial reconnaissance/target acquisition capability, the modern SAG would field the firepower, range, and flexibility to undertake most of the missions of the CBG at some fraction of the cost. Such a battle group would be configured for both conventional and nuclear strike missions and could, if properly designed, be deployed in sufficient numbers to markedly bolster the survivability of naval strike capabilities in the face of a nuclear threat. While individually vulnerable to nuclear attack, aggregate surface strike potential would be less susceptible to elimination by virtue of a greater number of offensive platforms. As noted above, in a nuclear environment, in particular, there is safety in numbers.

As an interim measure, the Navy can retrofit existing escort combatants with cruise missiles to upgrade surface strike capabilities in the short run. In doing so it must be recognized, however, that this is a partial remedy. Surface vessels not originally constructed to carry cruise missiles in specifically designed hulls will be required to bolt missile canisters to the deck. Space limitations, as well as topweight safety margins dictate that the number of missiles each retrofited combatant can carry is small in comparison to the loadout one might deploy aboard vessels specifically designed as cruise missile platforms.

The following combatants can carry up to eight cruise missiles with retrofit (two canisters):[21]

Warship Class	Number Deployed or Planned
-- Bronstein Class-FF 1037 Class	2
-- Garcia Class-FF 1040 Class	10
-- Knox Class-FF 1052 Class	46

Warship Class	Number Deployed or Planned
-- Brooke Class-FFG 1 Class[1]	6
-- Oliver Hazard Perry Class-FFG 7 Class	74
-- Forrest Sherman Class-DD 931 Class	14
-- Charles F. Adams Class-DD 2 Class	23
-- Decatur Class-DDG 31 Class	4
-- Mitscher Class-DDG 35 Class	2
-- Coontz Class-DDG 37 Class	10

The following combatants can carry up to sixteen cruise missiles with retrofit (four canisters):

Warship Class	Number Deployed or Planned
-- Spruance Class-DD 963 Class[2]	30
-- Kidd Class-DD 993 Class[3]	4
-- Aegis Class-CG 47 Class	16
-- Leahy Class-CG 16 Class	9
-- Belknap Class-CG 26 Class	9
-- Truxton Class-CGN 35 Class	1
-- Bainbridge Class-CGN 25 Class	1
-- California Class-CGN 36 Class	2
-- Virginia Class-CGN 38 Class	4

In the long-run it will prove necessary to design a new class of warships around the needs of the surface action group. As one study on the subject has noted, in designing a cruise missile dedicated surface combatant,

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[1]Over and above Standard/Harpoon magazine space.

[2]Not utilizing ASROC magazine space.

[3]Not utilizing either Standard magazine compartment.

two factors will predominate: hull volume and modular replenishment. For independent and sustained operations against defended fleet and shore targets, larger weapon loadouts will be required. Even assuming vertical launch system (VLS) magazines, a sufficiently high displacement is required. The VLS-configured warship will also aid in modular replenishment, which will be important for purposes of efficient resupply and rapid mission reorientation.[22]

Finally, the Navy must consider modifying its force structure to include a significantly larger number of low-cost units. The Navy's present order of battle unfortunately leaves it with few readily available low end combatants. The warship acquisition trend over the last two decades has been toward acquiring warships of high individual quality (and cost), at the expense of diminished fleet size. Unlike its Soviet counterpart, the Navy has envisioned no role for the expendable platform. The rationale for this policy was twofold: (a) as a sea control force, the U.S. fleet required a degree of endurance and a range of capabilities from its forces beyond that required of a continental navy whose principal mission is sea denial, and (b) U.S. naval planners operated on the assumption that fleet defense was a problem which could be handled with confidence if sufficient resources were allocated to its solution. On the basis of these assumptions, the Navy moved to construct a fleet composed of vessels with high individual capability. Meeting these requirements inevitably meant high unit cost and, assuming a fixed acquisition budget, a fleet of smaller size.

While the reasoning above may have validity under the assumption that a war at sea will be exclusively conventional in scope, it wears thin when we consider the possibility of a nuclear engagement. While high value combatants will certainly play an important role in such a conflict, it is likely that numbers will also prove a critical factor in determining its outcome. Under conditions of nuclear war at sea, the defensive problem facing the surface navy will be severe indeed. It is unlikely that for the forseeable future we will be capable of defending surface groups with a sufficiently high degree of confidence to exclusively depend on a small fleet, the design of which is predicated on the assumption that reliable defense is possible. Under the most favorable conditions, a nuclear

engagement at sea will be a contest of attrition. As individual combatants become more vulnerable to destruction, aggregate force capability must be maintained through a reinforced number of platforms.

B. GROUND-BASED AVIATION IN THE SEA STRIKE

In conjunction with the above measures, the Navy should closely consider the advantages proffered by the greater use of long-range maritime aircraft as a sea control weapon. The Soviet Union has long depended on long-range aviation in naval planning to good effect. Indeed, it is generally thought that the principal Soviet threat to U.S. forces at sea emanates not from their warships, but from land-based aviation, most importantly in this regard the Tupelov Backfire. Just as for the Soviet Union, the U.S. position at sea would decidely benefit from the proper utilization of land-based aviation. This will be particularly true in a high threat environment where ground-based aircraft are likely to prove more flexible, survivable, and hence more effective than the initial and exclusive employment of surface warships.

Already U.S. ASW capabilities importantly depend upon ground based aviation. Land-based aircraft further contribute to convoy defense, maritime reconnaissance, and to some degree augment U.S. anti-shipping capabilities. Despite these efforts, however, much more can be done to bolster the ability of the United States to control the sea in time of war through the increased employment of ground-based air.

To an important degree, ground-based aviation might be integrated with carrier operations to enhance battle group effectiveness and survivability. Such operations might be conducted in two ways. First, prior to the introduction of the CBG, it could prove useful to employ long-range air in offensive sweeps over prospective operating areas for the purpose of drawing down local Soviet forces. While long-range aviation will certainly not succeed in locating and destroying all Soviet maritime forces in the designated area, a significant degree of attrition might be realized. As noted above, if the Soviets are to maintain a high probability of penetrating battle group

defenses, a mass attack is required. To the extent local Soviet assets have been drawn down prior to the introduction of the CBG, the degree of concentration remaining Soviet forces can quickly mobilize against these forces, is reduced. While the vulnerability of individual combatants to a nuclear strike remains high, the probability of achieving a hit is diminished.

Secondly, in combination with the above 'supression' operations, ground based aviation might be employed for extended combat air patrol (CAP). In this capacity it can be conceived of as an airborne carrier escort, its principal missions being the early detection and interception of a long-range Soviet air threat. Once again, ground-based air would not be expected to establish a preclusive defense against Soviet naval aviation. Rather, the extended CAP would represent an additional perimeter of the battle group's already layered defense. In this role, it would serve not only as an additional means of attriting Soviet air assets, but would also provide extended warning of a Soviet air strike, thereby giving carrier-borne aircraft additional time to intercept surviving attackers before they are capable of consumating their strike. If well configured and their operations properly executed, ground-based aviation could, in the above respects, be expected to notably strengthen CBG security.

With the exception of the U.S.-European SLOC, where convoys will constitute an important Soviet target, U.S. forces operating in the open ocean can be expected to face a reduced threat and, as such, are not likely to require the extensive support of long-range aviation. The employment of ground-based aircraft will prove particularly valuable, however, in the enclosed seas surrounding the Soviet Union. It is in these areas that the threat to U.S. naval forces will be the most severe.

The offensive/defensive utility of ground-based air will prove particularly great in the European theater, where the balance of Soviet maritime capabilities are presently based. Most of the critical waters surrounding Europe are well within the combat radius of properly pre-deployed ground-based aviation. Long-range maritime strike aircraft operating out of Iceland, the Faeroe Islands, and Scotland would present a formidable challenge to the Soviet Northern and Baltic Fleets, and potentially to Soviet

naval aviation as well. Additionally, the entire Mediterranean is within the scope of aircraft operating out of facilities managed by a variety of regional U.S. allies. If well coordinated with CV and/or non-CV surface groups, wartime command of the European littoral may well be established and retained by the United States with a minimum of battle losses.

The Middle and Far East are other areas where ground-based air might be used to positive effect at sea. Long-range strike aircraft based on Diego Garcia, and potentially on former British facilities at Gan and Masirah, would provide a potent and cost-effective complement to U.S. sea control forces in the Indian Ocean. Similarly, U.S. access to the Philippines and Japan provides the Navy with the means to employ ground-based air against the Soviet Pacific Fleet. In this respect, Japanese facilities are of particular value given their proximity to Soviet Pacific bases.

To be sure, aircraft possess disadvantages as a sea control weapon. Perhaps most important among these is their inability to long remain on patrol. However, while low on-station endurance will always pose a problem in their employment, aircraft possess other combat advantages not shared by warships; most importantly, they can cover great distances quickly and are relatively inexpensive to procure. Their relative speed allows them to swiftly respond and concentrate against potential targets, thus to some degree, diminishing the need to remain at sea for long periods of time. Equally significant is the price of their construction and maintenance in comparison to that of a warship. As a relatively cheap commodity, the Navy could afford to deploy large numbers of maritime strike aircraft, thereby providing a degree of flexibility and redundancy to its sea control force otherwise unattainable through the exclusive acquisition of comparatively high-priced warships. Finally, as a cheap and numerous asset, maritime strike aircraft must ceteris paribus be considered more expendable in combat then are warships. If properly employed against Soviet submarine and surface forces they thereby promise an affordable exchange ratio in even a nuclear conflict at sea.

While the preceding is hardly a close assessment of the viability of ground-based aircraft in sea warfare, it is illustrative of what might be done with the more extensive and innovative application of these forces in adjunct to traditional naval assets. While long-range maritime aviation has long been an element of U.S. force structure and indeed has played a role in most modern navies, only the Soviet Union has sought to employ ground-based air in an aggressive manner. It would be well for U.S. naval planners to consider following the Soviet lead.

C. THE "STRATEGIC" EMPLOYMENT OF RESOURCES

In considering future modifications in U.S. naval forces and tactics, it will prove useful to take note of the maxim ". . . what is of supreme importance in war is to attack the enemy's strategy". Forces designed to "attack the enemy's strategy" seek victory not predominantly through the attrition of enemy assets, but through the disruption of enemy operations and plans. Such an approach promises to impart important economies of effort, allowing the adversary employing such tactics to defeat his opponent with fewer forces and losses than would otherwise be the case. If one doubts this proposition, one has only to look again at Soviet maritime capabilities, which, while inferior in the absolute sense, will be employed in such a manner as to seriously hazard Western naval power.

As suggested in the preceding pages, economy of effort will be an important consideration in any future naval war in which nuclear weapons are employed. Given the high expected rate of warship loss in a nuclear engagement, it will be important that naval assets are employed in combat in a manner which minimizes aggregate force vulnerability while maximizing its expected returns. While the Soviet Navy has become a formidable force, it remains subject to a number of serious deficiencies. As Western supremacy at sea continues to ebb, it will become increasingly important to be able to effectively exploit these prospective vulnerabilities in any future naval war. In this regard, U.S. planners would be well served to pay close attention to Soviet shortcomings in designing future naval forces and battle doctrine.

One aspect of Soviet maritime posture which might well be subject to Western exploitation is their close dependence on centralized command, control, and communications (C^3) in coordinating an attack against defended targets.[23] If Soviet forces are to effectively concentrate against Western surface groups, they must be capable of synchronizing their efforts. To achieve this end, the Soviets have brought the balance of their C^3 functions ashore. Forces earmarked for an attack are vectored to their target from Moscow or Odessa. From its facility ashore, Soviet naval command monitors enemy fleet movements and coordinates the attack of its forces far out at sea. Ideally composed of a diverse group of platforms moving toward their intended target from a variety of points and speeds, the attacking force will require close control from naval command if a saturation attack is to be achieved. It follows that anything which effectively interferes with Soviet surveillance sensors or the ability of Soviet shore facilities to communicate with their forces on-station will notably diminish the probable effectiveness of an impending attack. If the attacking force launches out of sequence, saturation will not be realized. Similarly, should Soviet forces be decoyed into firing against false targets by "spoofing" the directing shore facility, the attack will fail.

In light of Soviet dependence on distant sensor and C^3 links it could prove useful to supplement one's direct defense against attacking platforms with a defense directed against the "heart" of the system. While we may be reluctant to eliminate Soviet naval command in a conflict limited to the theater, it is possible to neutralize its effectiveness through destroying or deceiving the enemy's sensors and jamming his communications. To the degree we are successful in doing so, the Soviet maritime threat will be reduced. This tactic is made all the more important by virtue of the limited to nonexistent reload capability of Soviet combatants. If Soviet forces are to maximize their initial chances of saturating enemy defenses, they will be constrained to empty their batteries in the first salvo. Piecemeal attacks run the risk of being defeated in sequence and in detail. While heightening the probability of initial success, in focusing their efforts on the first salvo, Soviet forces will have effectively disarmed themselves in firing. In the event efforts go unrewarded, there will probably be no second chances.

The inability of Soviet warships to engage in sustained combat suggests another way in which the objective shortcomings of Soviet maritime power might be exploited. If Soviet forces at sea are only capable of launching a single, concentrated salvo prior to expending their weapons load, it might behoove the West to hold its high value assets in reserve, while initially engaging fleet groups with relatively expendable units designed to force the Soviet hand. Having compelled local Soviet forces to employ the balance of their ordnance against the decoying target, this reserve might in turn, be concentrated against surviving, now semi-disarmed Soviet units. Although a less valuable and hence more expendable asset, the decoy force must nevertheless have the ability to project a credible defense, as well as the means to seriously threaten those forces it seeks to engage. In this way it will force local Soviet units to aggressively respond to its presence, while allowing it the chance to survive the engagement. Although losses will certainly be suffered, this tactic has the advantage of minimizing the risk to the less expendable components of the surface fleet against which Soviet naval strategy is predicated.

The use of expendable platforms to deflect the brunt of an attack away from high value units is not without historical precedent. While many examples can be cited, one of the more useful can be found in the battle for Okinawa in 1945.

The problem faced by U.S. planners at Okinawa was how to ensure the success of the island's invasion while minimizing the threat to the high value carrier force shielding the landing operation. The principal threat to U.S. naval units operating in support of the invasion force was suicide attack from the air. For long a Japanese stronghold and within one-way range of airfields in Japan, Formosa, and mainland China, the airpower the Japanese were capable of mobilizing against the U.S. fleet off Okinawa was formidable.[24]

In an attempt to deal with this problem, the Navy deployed a screen of picket ships around the island, between 40 and 70 nmi from the designated landing zone. The screening force, composed predominantly of destroyers and destroyer escorts, was assigned the following missions.

- Directly strike incoming attackers
- Draw fire from incoming attackers
- Provide early warning and threat assessment for the main naval force deployed off Okinawa
- Vector CAP aircraft into position to interdict incoming raiders.

While the principal mission of the screening force was not to absorb Kamikazes, it quickly became apparent that the destroyer picket was acting as a magnet to Japanese aircraft and was indeed drawing a disproportionate percentage of their fire. As illustrated in Table 1, screening force losses were extremely high relative to previous engagements of the war. Against a concentrated attack by suicide aircraft, hits were almost inevitable. Against a lightly armored destroyer, few hits were required to send it to the bottom. As a result, forty-eight picket ships were either destroyed or damaged during the period that U.S. naval forces were deployed off Okinawa in force. Despite these exceptionally high losses, however, the decision was made to continue the screening operation. Indeed, the screening force was reinforced as the expected threat grew in severity.

The reasons for continuing this tactic were straightforward and in retrospect, correct. Losses to the picket screen, although high, were judged acceptable in light of the importance of the objective and the assistance rendered by the screening force in diminishing the air threat to the high value naval units it was designed to protect. While the picket force could not be expected to deflect and absorb all Japanese efforts to strike major U.S. combatants deployed off Okinawa, it is evident that the damage suffered by allied capital units in that campaign would have been notably more severe had the expendable destroyer screen not been so deployed.

As in the naval battle off Okinawa, low value, expendable assets can potentially play an important role in a future U.S.-Soviet nuclear war at sea. If properly coordinated with high value fleet units, most notably the attack carrier, such a force might well be capable of exploiting the Soviet inability to engage in sustained combat, while minimizing the threat to those forces the navy cannot afford to lose. While the tactics by which low end platforms can be best employed have yet to be developed, the potential utility of such combatants needs to be reexamined.

TABLE 1

CASUALTY ANALYSIS FOR OKINAWA OPERATIONS

TYPE OF ATTACK	SHIPS LOST OR DAMAGED	CASUALTIES KIA OR MIA	WOUNDED	TOTAL
Air Attacks (Kamikaze)				
DD/DE Picket Ships				
Kikusui raids[a]	39	1,369	1,666	3,035
Other air attacks	8	105	230	335
All Other Ships	86	2,691	3,295	5,986
Total Air Attacks	133	4,165	5,191	9,356
Mines	5	177	79	256
Coastal Batteries	3	90	131	221
Suicide Boats	5	8	21	29
All Types of Attacks	146[b]	4,440	5,422	9,862

[a] Kikusui in Japanese means "floating chrysanthemums," and was used by the Japanese in the Iwo Jima and Okinawa operations to denote masses attacks by kamikaze ("divine wind") aircraft of all kinds and Oka jet-glide suicide bombs. From 6 April 1945 through 22 June 1945 ten kikusui raids totalling 1,465 sorties were mounted at Okinawa. Although torpedoes and bombs were used, suicide tactics account for nearly all U.S. losses in air attacks.

[b] Thirty-two ships were sunk or scuttled, of which nearly all were victims of kamikaze aircraft and/or Oka bombs.

Source: P. Gardner, "Expendability Considerations in Naval Warfare," unpublished paper, September 1979. Casualty data compiled from Samuel Eliot Morison, History of United States Naval Operations in World War II, Vol. XIV, Victory in the Pacific 1945, Little, Brown and Co., 1960.

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The Soviet Union has promulgated and refined a doctrine of nuclear employment encompassing both the ground and maritime theaters. Although U.S. defense planners recognize the possibility that a ground conflict may well escalate beyond the nuclear threshold, U.S. planning for sea warfare has been based on the implicit premise that a future naval conflict will be conventional in scope. Soviet developments in the area of naval nuclear war coupled with years of neglect on the part of the U.S. Navy has left U.S. naval power in general and the U.S. surface fleet in particular, highly vulnerable to nuclear strike.

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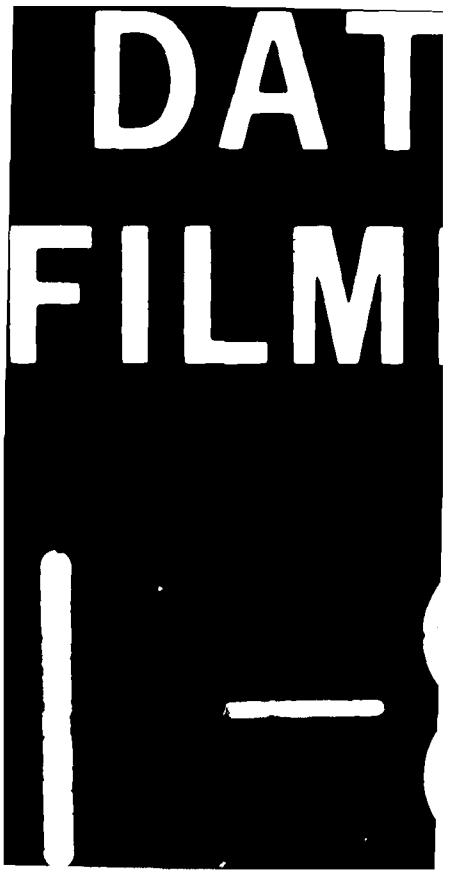
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